LONG-TERM EFFECTS OF A LIFESTYLE-CHANGE OBESITY TREATMENT PROGRAM WITH MINORITIES

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Obesity and a sedentary lifestyle places Americans in general, and minorities in particular, at risk for a number of chronic health problems: cardiovascular and cerebrovascular disease, diabetes, and hypertension, to name a few. It is therefore concluded that walking or other energy-expending activities and a sensible diet are not only an efficient weight-loss approach, but the most effective long-term weight maintenance approach available to date. Moreover, the potential for enhanced psychological well-being, increased health benefits, and reduced risk factors is also far greater with diet and exercise than with diet alone.

Practitioners concerned with improving the overall health status of obese minorities would be well advised to remember that dieting is a depriving experience, while walking and other aerobic activities can be an exhilarating experience that gives the obese individual another degree of freedom.

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Despite the well-intended efforts of a number of obesity practitioners and researchers to re-invent the "weight loss wheel" over the past 30 years and the availability of over 2,500 methods to promote weight loss, successful intervention programs to reduce excess weight among minorities remain elusive.

Thus, one of the major challenges facing today's health professional concerned with improving the health status of minority group members is the treatment of obesity. Weight control programs, irrespective of their elegance, focus, intent, and origin, however, must still address the irrefutable fact that weight loss or gain is a function of the basic energy equation. Simply put, to lose excess weight, a negative energy balance must be created by (1) decreasing energy input, (2) increasing energy output, or (3) combining 1 and 2.

With few exceptions, obesity treatment programs for minorities have focused on the "energy-in" side of the basic equation,[1–4] and have achieved disappointing results. More encouraging, however, have been the weight loss and long-term weight maintenance results reported by obesity treatment practitioners who have included physical activity as an adjunctive treatment component.[5–7] The present study describes a lifestyle change (ie, combined behavior modification, nutrition education, physical fitness) approach to weight management and summarizes short-term weight loss results and long-term outcome data from an 18- to 24-month follow-up investigation.

METHODS

Recruitment and Assessment

By way of newspaper articles in local newspapers and announcements in community church bulletins, minority group members interested in losing excess weight were informed of an opportunity to participate in a 12-week weight-management program that would have lifestyle change as its central focus. Respondents to the announcements (n = 22) were invited to a one-hour meeting at a neighborhood YMCA. Key aspects of the program were explained and time was alloted for questions concerning the program. At the conclusion of the pre-program meeting, the 12 individuals interested in joining the program signed a program committal form and had their physical fitness status assessed. There were 11 women and one man. To ascertain the number of calories consumed prior to beginning the program, potential participants were instructed to record their normal daily food intake for one week. The program committal form, which was designed to enhance participation and reduce attrition, indicated the person's willingness to attend weekly group meeting for 12 weeks and record their eating and activity patterns; to participate in one hour of physical activity at each group meeting and engage in some form of physical activity during the week; to evaluate the degree to which material presented during the program facilitated weight loss; to have his or her physical fitness level assessed at the beginning and end of the program; and to pay $20 within three weeks to cover the cost of program materials.

The subjects' levels of education averaged between three and four years of college, and all joined the program for health reasons and improved self-esteem. Pre-program physical fitness measures (ie, resting heart rate, blood pressure, muscular endurance, and flexibility) are presented in Table 1. Blood pressure was taken and initial weight was obtained by the fitness examiner (J.P.) at the end of the pre-program meeting. An abbreviated form of the YMCA's fitness protocol was used to determine participants' initial level of fitness.[8] Muscular endurance was assessed by counting the number of sit-ups completed by the participant in one minute with hands clasped behind the head and feet held firmly on the floor. To determine the degree of flexibility, a yardstick was placed between the subject's legs while sitting in an upright position. The farthest distance stretched over the yardstick in three trials was the recorded amount of flexibility.

TABLE 1. DESCRIPTION OF PATIENT POPULATION

Characteristic	Mean	SD
Initial weight (lb)	175.91	27.66
Age (yrs)	43.91	11.39
Resting heart rate	81.00	5.75
Blood pressure		
Systolic	131.87	7.65
Diastolic	85.25	3.01
Muscular endurance	12.00	9.54
Flexibility	16.75	2.55

SD—Standard deviation

At the conclusion of the 12-week program, the physical fitness test was readministered and participants completed a program evaluation form, indicating on a scale of 1 to 5 the extent to which the weight management techniques introduced during the program were helpful (eg, eating diary, pre-recording, calorie goal, walking graph, etc). Eighteen months after completion of the program, participants were contacted by mail and asked to complete the post-program evaluation form again and a follow-up questionnaire. Information requested on the follow-up questionnaire included current weight, present eating and activity patterns, medical problems and/or marital difficulties experienced over the follow-up period, as well as the number of weight-loss attempts, methods used, and amount of weight lost with each method since the last contact with the program. A stamped, self-addressed envelope was provided to each participant to facilitate the return of the follow-up information.

Program Description

The 12-week program met each week for two hours at the YMCA. Participants were weighed on a physician's balance-beam scale at each meeting, were encouraged by the group leader to make qualitative and quantitative changes in their diet, and were to go for a 20- to 30-minute walk each day at a modest pace. During the first hour of the meeting, problems encountered in complying with the program were discussed, and participants received positive reinforcement for their weight-management efforts in the past week. The group leader also lectured each week for 15 to 20 minutes on a number of topics related to the hazards of obesity, sound nutritional practices, exercise adherence, and emotional eating. Topics

TABLE 2. TOPICS COVERED DURING THE PROGRAM

Assertiveness training and body imaging
Basic nutrition and a prudent diet
Continued weight loss and relapse prevention
Cue-elimination and pre-planning techniques
Designated eating place and slower eating strategies
Monitoring caloric intake and pre-recording
Pathophysiology of obesity
Physical activity and exercise
Psychologic aspects of obesity and weight loss
Realistic goal setting
Social support network
Total body fitness

covered during the program are presented in Table 2. Following each lecture, the group leader presented the group with a lifestyle-change/weight-management technique. Eating and activities' diaries from the past week, which had been reviewed, were also returned, and new weekly diaries were distributed.

The second hour of the two-hour group meeting was set aside exclusively for physical activity. In weeks one through four, half of the physical-activity hour was devoted to demonstrating flexibility and muscular-endurance exercises and to teaching participants how to find and take their pulse, determine their target heart-rate zone, and monitor their cardiovascular improvement. The remaining time was spent going for a pleasant group walk at a moderate (3 mph) pace. As the program progressed (weeks five through 12), participants walked briskly (4 mph) for 45 minutes during the second hour of each meeting and devoted 10 minutes each, before and after walking, to warm-up and cool-down stretching and flexibility exercises.

Group Leader

The total program (ie, didactic presentations, fitness evaluations, group exercises, and walking) was under the direction of the author. In addition to being an experienced group leader, the author was co-director of a large, behavior-oriented treatment program at a major university in another area of the city.

RESULTS

Attrition

Eight of the 12 participants who enrolled in the program attended nine or more sessions and completed all program requirements (ie, post-program fitness evaluation and evaluation of program strategies). Four participants dropped out of the program; one attended only one session, and three failed to return after the fourth meeting. The major reasons given for discontinuing the program included discouragement over slow weight loss, transportation problems, and difficulty in finding a babysitter.

On average, the dropouts were younger ($\bar{X}$ = 36 vs 48 years), had a lower initial weight ($\bar{X}$ = 162 vs 181 lb), and had lost less weight by the fourth meeting than those who completed the program ($\bar{X}$ = 3.0 vs 3.5 lb lost). Dropouts also differed with respect to prior program involvement. All of the dropouts had joined other weight control programs three or more times prior to joining the program, while only one of the program completers reported ever being involved in a formal weight control group.

Post-program and Follow-up Assessment

As can be seen in Table 3, within-group changes for body weight, resting heart rate, systolic and diastolic blood pressure, muscular endurance, and flexibility were all significant. While the mean pre- to post-program weight loss for the total group (n = 12) was 8.4 lb, participants who completed the program (n = 8) lost 10.9 lb on the average. Five participants lost between 10 and 20 lb, and three lost less than 10 lb.

Follow-up material was returned by eight of the original 12 participants. The four non-responders were the same participants who had dropped out of the program two years ago. Repeated attempts to obtain follow-up information by mail and telephone failed, and follow-up of these participants was discontinued after six months. Considering only the participants who furnished follow-up data, the mean pre-program to follow-up weight change was 7.4 lb.

Because grouped data obscures the individual weight loss and/or gain performance of program participants, the analytic technique proposed by Stun-

TABLE 3. MEAN PRETREATMENT AND POSTTREATMENT SCORES AND WITHIN-GROUP CHANGES

	Pretreatment		Posttreatment		
Dependent Variable	**Mean**	**SD**	**Mean**	**SD**	***t***
Bodyweight	175.91	27.66	167.54	28.31	5.75***
Resting heart rate	81.00	5.75	74.25	7.66	5.67***
Blood pressure					
Systolic	131.87	7.65	127.37	8.76	3.18*
Diastolic	85.25	3.01	79.00	4.40	7.09**
Muscular endurance	12.00	9.59	19.85	11.52	−4.07***
Flexibility	16.75	2.55	20.12	2.41	−3.37***

* $P < .05$
** $P < .07$
*** $P < .005$
SD—Standard deviation

kard and Penick[9] was used in Figure 1 to illustrate the extent to which individual program weight losses were maintained. Treatment or program weight loss is plotted on the vertical axis and follow-up weight loss is plotted on the horizontal axis. The diagonal line from the lower left to the upper right corner of the figure represents weight maintenance. Data points to the right of the diagonal line represent participants who continued to lose weight after the conclusion of the program, while those data points falling to the left of the line represent participants who regained the weight lost during the program. The two participants falling to the right of the diagonal line lost 3.1 additional pounds over the follow-up period ($\bar{X}$ = 11.1 vs 14.2 lb). Of the six participants falling to the left of the diagonal line, five maintained 60 percent of the weight lost during the program ($\bar{X}$ = 12.2 vs 7.2 lb). The remaining participants in the bottom left quadrant of the figure regained all of the weight lost (plus additional weight) and were heavier than when the program began.

Finally, in Table 4, 16 lifestyle-change/weight-management techniques introduced during the program are listed. The ratings, on a scale of 1 to 5, where 1 = not at all helpful and 5 = very helpful, indicate the extent to which the techniques facilitated weight loss during the program and continued weight loss and weight maintenance over the 18- to 24-month follow-up period. Techniques found to be most helpful (ie, mean rating of 4.0 or higher) during the program were: keeping an eating diary, counting caloric intake, keeping a walking graph, exercising and walking during the two-hour group meeting, cooking smaller amounts, and setting a weekly walking goal. Setting a caloric goal, estimating calories from a plate, reducing refined-sugar products and keeping a weight loss graph were all rated as being moderately helpful ($\bar{X}$ = 3.5 or higher).

With the exception of refusing fattening foods from family and friends, all of the lifestyle-change techniques introduced during the program lost their potency over time. Despite the overall diminution, keeping an eating diary, keeping a walking graph, and setting a weekly walking goal continued to receive high mean helpfulness ratings of 4.1, 4.3, and 4.3, respectively, at follow-up.

DISCUSSION

The overall program results suggest that an obesity treatment approach for minorities that focuses on lifestyle change may be more advantageous than a traditional dietary-restriction approach. In addition to lowering attrition, sustaining program interest, and facilitating weight loss and weight maintenance, the program appears to have been instrumental in enhancing the health status of participants who completed it.

A review of minority-intervention programs for obesity reveals a dropout rate, depending on the criteria used, of 40 to 80 percent.[1-3,10] Using a rigid program-completion criterion of 75 percent attendance, eight of the initial 12 participants completed the program. Typically, obese individuals experience the greatest difficulty in managing eating behavior and following a consistent exercise regimen on the weekend. It may well be that the individualized attention, instruction, and reinforcement that participants re-

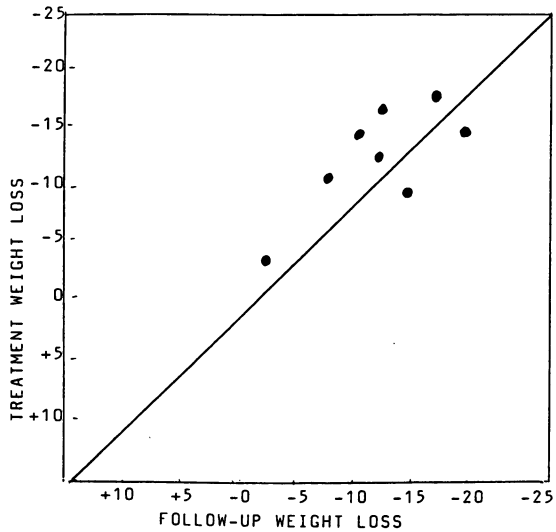

Figure 1. Pretreatment to follow-up weight loss/gain

ceived from the group leader while walking (eg, during the second hour of the weekly group meetings and on Saturday mornings) influenced continued participation in the program. Stressing the importance of attendance and program adherence (ie, high program expectation), and informing participants that the lifestyle program was not designed to produce a rapid weekly weight loss before the program began (ie, low weight-loss expectation), also may have contributed to the high retention rate.

As far as long-term program effects are concerned, program weight losses obtained in the present study are greater than those reported previously from obesity-intervention programs for massively and moderately obese minorities.[1-3,10] Furthermore, the long-term weight-maintenance results compare favorably with findings from obesity-treatment outcome studies having follow-up periods of one or more years.[9,11]

Weight-management techniques in the present study that were related to successful outcome were (1) keeping an eating diary (a standard behavior-modification technique used to reduce "energy-in"), and (2) keeping a walking graph and setting a weekly walking goal (techniques designed to promote a more active lifestyle). While keeping an eating diary received high post-program and follow-up helpfulness ratings, other behavioral strategies introduced during the program to alter emotional eating habits (eg, pre-recording, eating slowly, putting utensils down, leaving food on the plate) were not found to be very helpful. This finding suggests that practitioners' time might be better spent developing innovative ways to reduce food intake with minority participants rather than continually introducing strategies to change emotional eating habits.

TABLE 4. MEAN RATINGS AND STANDARD DEVIATIONS OF HELPFULNESS OF WEIGHT MANAGEMENT TECHNIQUES AT POSTTREATMENT AND FOLLOW-UP*

Weight Management Technique	Posttreatment		Follow-up	
	Mean	SD	Mean	SD
Keeping an eating diary	4.87	.35	4.12	.64
Pre-recording	3.12	.64	1.50	.53
Setting a calorie goal	3.75	.71	2.87	.64
Counting daily calorie intake	4.12	.64	3.00	.54
Eating slowly	2.87	.84	1.25	.46
Estimating calories from a plate	3.50	1.20	2.87	.64
Keeping a walking graph	4.87	.35	4.25	.46
Imagining yourself thin	2.87	.64	1.37	.51
Leaving food on your plate	3.12	.64	1.75	.46
Refusing fattening food from family and friends	3.00	1.06	3.25	.71
Putting utensils down	2.75	.71	1.75	.46
Exercising and walking Monday night	4.00	1.19	2.27	.41
Reducing refined-sugar products	3.62	.91	3.25	.71
Keeping a weight-loss graph	3.87	.64	3.00	.76
Cooking smaller amounts	4.00	.76	3.12	.64
Setting a weekly walking goal	4.75	.46	4.25	.71

* On a scale of 1 to 5, where 1 = not at all helpful and 5 = very helpful

The "energy-out" side of the basic energy equation represents an untapped area in the treatment of obesity. Despite abundant evidence that exercise alters body composition, burns fat, spares lean body mass, increases muscle tissue, which is more active metabolically than fat tissue, changes the metabolic rate (to counter the metabolic cutback that occurs during restricted dieting), and elevates the postexercise metabolic rate above the basal state for up to 48 hours after completion,[5,12-14] only a small percentage of obesity-treatment programs include physical activity as an adjunctive component.[5-7] Fifty percent of the

study group time during the 12-week lifestyle-change program, however, was devoted specifically to physical activity. Walking was chosen as the core physical activity because it is simple, cost-effective, and can be incorporated easily into the lifestyle of an obese individual, and does not require the development of new athletic skills.[15,16]

It appears as though the increased energy expenditure as a result of walking not only facilitated weight loss and long-term weight maintenance but conferred other direct health benefits as well. For example, blood pressure, which is alarmingly high among minorities, was lowered significantly at the end of the lifestyle-change obesity-treatment program. A significant reduction in resting heart rate was also obtained, suggesting improved coronary efficiency and reduced cardiovascular risk. Walking apparently influenced these benefits directly, because positive changes of this magnitude are rarely, if ever, achieved with "diet alone" approaches.

Finally, in addition to changes in the physiologic indicators related to obesity, the psychological changes gleaned from individual follow-up questionnaires as a result of walking and weight maintenance included reduced lethargy, increased confidence, a more positive body image, and an improved sense of general well-being. While indirect, these changes are consistent with findings from studies documenting the affective benefits of exercise on psychological health.[5,15-17]

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